"Beiträge zur Flora von Afrika XXXV" has published 125 new species and several varieties of flowering plants. The following new genera are proposed: *Lingelsheimia*, *Baccaureopsis*, and *Milbraedia* of the Euphorbiaceae, *Pierrina* of the Scytopetalaceae, and *Ledermanniella* of the Podostemonaceae. The contribution is based chiefly on the collections of Dr. J. MILBRAED.—O. MÜLLER (*ibid.* Beibl. No. 100. pp. 1–40. *pls. 1, 2*) lists a large number of Bacillariaceae from southern Patagonia from the collections of E. NORDENSKIÖLD and O. BORGE. Several new species and varieties are described.—E. L. GREENE (Rep. Nov. Sp. 7: 195–197. 1909) under the title "Novitates Boreali-Americanae IV" has published 7 new species of sympetalous plants.—J. R. DRUMMOND (Curtis' Bot. Mag. IV. 5: *t. 8271.* 1909) describes and illustrates a new species of Agave from Central America. M. GURKE (Monats. Kakteenk. 19: 116–121. 1909) describes and figures a new species of cactus (*Cephalocereus DeLaetii*) indigenous to Mexico.—W. FAWCETT and A. B. RENDLE (Jour. Bot. 47: 263–266. 1909) in continuation of their studies on Jamaican orchids have published 6 new species and include 1 new genus (*Harrisella*) which is based on *Aeranthus porrectus* Reichb.—A. and E. S. GEPP (*ibid.* 268, 269) have described a new species of Udotea from St. Thomas.—W. A. MURRILL (Mycologia 1: 140–160. 1909) in a second article on the "Boletaceae of North America" gives a synopsis of the genus Ceriomyces, recognizing 35 species, and (*ibid.* 218, 219) describes a new species of this genus from the volcano of Turrialba, Costa Rica.—E. ROSENSTOCK (Rep. Nov. Sp. 7: 146–150. 1909) under the title "Filices Novae V" describes new species of ferns, 3 of which are from Ecuador.—F. C. CLEMENTS and H. L. SHANTZ (Minn. Bot. Studies 4: 133–135. *pl. 20.* 1909) have proposed a new genus (*Eucapsis*) of the blue green algae; the genus is represented at present by a single known species (*E. alpina*) from Colorado.—C. H. PECK (Bull. Torr. Bot. Club 36: 153–157. 1909) has published 10 new species of North American fungi.—J. K. SMALL (*ibid.* 159–164) in an article entitled "Additions to the flora of peninsular Florida" records several species hitherto unknown from the mainland and describes 5 new species.—A. D. E. ELMER (Leafl. Philip. Bot. 2: 595–629. 1909) has described 11 species and 2 varieties of Philippine plants as new to science. Synopses of the Philippine species of Fagraea, Artocarpus, and Hydrocotyle are given, and a new generic name (*Adelmeria* Ridl.) is proposed to take the place of Elmeria recently described in this journal.—J. M. GREENMAN.

**Corn breeding.**—Several recent papers have appeared advocating the use of hybridization methods in the production of Indian corn, instead of the usual ear-to-the-row method which is based upon the idea of isolation of pure types. As early as 1893 and 1894 GARDNER and MORROW[6] showed that crosses between different strains of corn give somewhat increased yields over either of the parent strains, and a method was outlined by which this advantageous circumstance could

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[6] MORROW, G. E., AND GARDNER, F. D., Bulletins 25 and 31, Illinois Agricultural Experiment Station. 1893, 1894.

be readily utilized. Two years ago the reviewer read a paper[7] before the American Breeders' Association in which it was shown that a field of Indian corn consists of a large number of elementary species thoroughly hybridized in complex fashion, and gave evidence that the vigor necessary to the production of large yields is due to the degree of heterozygosis possessed by the individuals composing the crop. This paper closed with the suggestion that "continuous hybridization instead of the isolation of pure strains is perhaps the proper aim of the corn breeder." Based upon this conception the reviewer[8] worked out a scheme of corn breeding in which definite pure lines were isolated and recombined, so that the field crop would consist of first-generation hybrids between these two pure lines, thus insuring perfect uniformity as well as high yield. Simultaneously with this latter paper there appeared two other papers presenting suggestions for a similar method of corn breeding. In the first of these EAST[9] suggests the purchase by the farmer of two highly bred strains from the professional corn breeder, and the hybridization of these two strains each year to produce the seed corn for the field crop, arguing that the methods used by the professional breeder are such as to render these strains already to a considerable extent homozygous. This method is the same as that of MORROW and GARDNER. EAST recognizes the relation between this method and the pure-line method of the reviewer, saying that the latter is more correct theoretically, but less practicable than the method he suggests. EAST gives a clear and incisive discussion of the significance of the pure-line idea. COLLINS[10] has issued a bulletin also advocating the use of continuous hybridization in corn breeding. The appearance of three papers simultaneously advocating the same innovation in corn breeding is likely to have great influence on the activity of those engaged in this work. The bulletin by COLLINS is unfortunately quite vague in its language, as might be inferred from the title, "The importance of broad breeding in corn." Comparing the conception of "broad breeding" with the conception involved in the other two papers appearing simultaneously with it, both of which are expressed in terms of definite hybridization, gives a fair indication of the relation between these papers. In keeping with his title, COLLINS says "had it been realized that diversity is as necessary to the life of the species as is chlorophyll to the life of the individual, it would have been evident that one might as well breed to eliminate the green color from the leaves as to suppress this corn variation." He says also that "the appearance of so-called barren stalks in a field of corn may be thought of as an adaptation to avoid self-pollination," and adds that "the elimination of these

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[7] SHULL, G. H., The composition of a field of maize. Amer. Breeders' Assoc. **4**:296–301. 1908.

[8] ———, A pure line method in corn-breeding. Amer. Breeders' Assoc. **5**:51–59. 1909.

[9] EAST, E. M., The distinction between development and heredity in in-breeding. Am. Nat. **43**:173–181. 1909.

[10] COLLINS, G. N., The importance of broad breeding in corn. U. S. Bureau Plant Industry, Bull. 141[4]:33, 34. 1909.

proterandrous plants results in increasing the percentage of self-pollinated plants, and is a practice of doubtful value."

SMITH[11] has issued a bulletin dealing primarily with the results of selection of ears which are placed high on the stalks and those which are placed low on the stalks, and showing that very material difference may be secured by five years' selection. A comparison is then made between the two strains so produced in regard to qualities such as time of maturity, yield, etc. The results accord very well with the notion that ordinary varieties of corn are much hybridized, and that the selection results in a partial separation of the biotypes involved.—GEO. H. SHULL.

**Morphology and sexuality of Aspergillus and Ascophanus.**—In *Aspergillus repens*, a form differing slightly in structure from *Aspergillus herbariorum* as described by Miss FRASER and Miss CHAMBERS,[12] Miss DALE[13] describes another case of so-called reduced fertilization among the Ascomycetes. After a brief historical and systematic consideration of the species, she describes the multinucleate hyphae of the mycelium, from which arise the multinucleate conidia as apical swellings. The archicarp is initiated as a slender branch, which usually soon becomes regularly and closely coiled into a spiral. The regular occurrence of definite ascogonia and antheridia as figured by DEBARY was rarely found, the antheridium often being absent. No convincing proof of a fusion of sexual organs, even when both were present, was discovered. Transverse walls, whose position and number vary considerably, appear in the archicarp either very early or at a much later stage. Ascogenous hyphae develop in some cases from all of the cells of the ascogonium. The investing hyphae show great variations in the time at which they arise, as well-developed ascogonia with ascogenous hyphae quite uninvested are often found. The young archicarp, which arises as a multinucleate branch, possesses nuclei of about uniform size. Later variations in size of the nuclei appear, which Miss DALE accounts for chiefly by a fusion in pairs, although nuclei may perhaps grow. Such nuclear fusions are figured in all cells of the ascogonium. Since no antheridium is believed to fuse with the oogonium, these nuclear fusions are held to be reduced sexual ones. These fusion nuclei pass into the ascogenous hyphae. In the development of the ascus, which arises from the penultimate cell of a hypha, the usual nuclear fusions and subsequent triple divisions occur. Karyokinesis was not observed.

CUTTING[14] finds in *Ascophanus carneus* still another case of reduced fertiliza-

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[11] SMITH, L. H., The effect of selection upon certain physical characters in the corn plant. Ill. Agric. Exper. Sta. Bull. 132:50–60. 1909.

[12] FRASER, MISS H. C. I., AND CHAMBERS, MISS H. S., The morphology of *Aspergillus herbariorum*. Ann. Mycol. **5**:419–431. 1907.

[13] DALE, MISS E., On the morphology and cytology of *Aspergillus repens* DeBary. Ann. Mycol. **7**:215–225. 1909.

[14] CUTTING, E. M., On the sexuality and development of the ascocarp of *Ascophanus carneus* Pers. Annals of Botany **23**:399–417. 1909.